

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Cobbley et al.

Patent No.: 7,134,390 B2

Issued: November 14, 2006

For: METHOD AND STENCIL FOR
EXTRUDING MATERIAL ON A
SUBSTRATE

Attorney Docket No.: 2269-3394.5US

VIA ELECTRONIC FILING
September 13, 2007

**REQUEST FOR CERTIFICATE OF CORRECTION OF PATENT
OFFICE MISTAKES (37 C.F.R. § 1.322)**

Attn.: Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

It is noted that several errors appear in this patent of a typographical nature. These errors are due to mistakes in printing on the part of the U.S. Patent and Trademark Office, and occurred through no fault of the Applicants. A certificate of correction in the form attached hereto is requested.

Please note that an Amendment Pursuant to 37 C.F.R. § 1.312(a) (copy enclosed) was filed concurrently with the issue fee on June 29, 2006, but was apparently the changes were not completely entered before issuance of the patent. Attached is a copy of the previously filed Amendment Pursuant to 37 C.F.R. § 1.312(a) and the date-stamped postcard, acknowledging receipt by the PTO, to provide proof of such filing. We have included subject matter of this amendment on the attached PTO/SB/44 suitable for printing.

Please send the Certificate to:

Name: James R. Duzan
Address: TraskBritt
P.O. Box 2550
Salt Lake City, Utah 84110

Attached hereto in duplicate is Form PTO/SB/44 suitable for printing.

Respectfully submitted,



James R. Duzan
Registration No. 28,393
Attorney for Applicant(s)
TRASKBRITT
P.O. Box 2550
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Telephone: 801-532-1922

Date: September 13, 2007
JRD/csw

Enclosures: Copy of Amendment Pursuant to 37 C.F.R. § 1.312(a)
Copy of date-stamped postcard

Document in ProLaw

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 7,134,390 B2
APPLICATION NO. : 10/608,750
DATED : November 14, 2006
INVENTOR(S) : Chad Cobbley and Ford B. Grigg

Page 1 of 3

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the drawings:

In FIG. 1, move the lead line extending from reference numeral "18" to indicate the center of the aperture; then change reference numeral "18" to --16-- and change reference numeral "16" to --18--

In FIG. 2, lengthen lead line of reference numeral 16 to extend into center of aperture

In the specification:

COL. 5, LINE 22, change "the-semiconductor" to --the semiconductor--

MAILING ADDRESS OF SENDER (Please do not use customer number below):

James R. Duzan
TRASKBRITT
230 South 500 East, Suite 300
Salt Lake City, Utah 84102 USA

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.
SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 7,134,390 B2
APPLICATION NO. : 10/608,750
DATED : November 14, 2006
INVENTOR(S) : Chad Cobbley and Ford B. Grigg

Page 2 of 3

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Please replace FIG. 1 with the following amended figure:

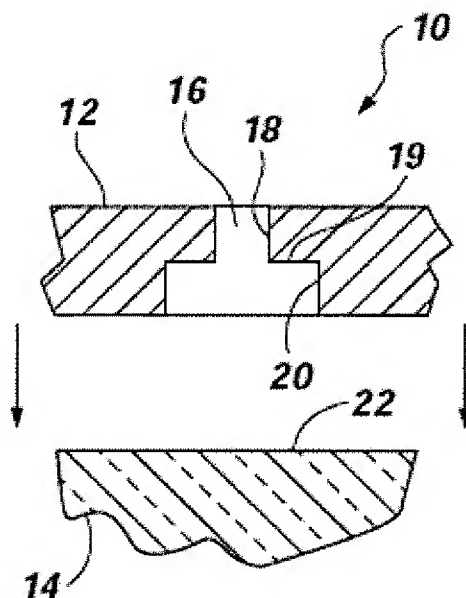


Fig. 1

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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Salt Lake City, Utah 84102 USA

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PATENT NO : 7,134,390 B2
APPLICATION NO. : 10/608,750
DATED : November 14, 2006
INVENTOR(S) : Chad Cobbley and Ford B. Grigg

Page 3 of 3

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Please replace FIG. 2 with the following amended figure:

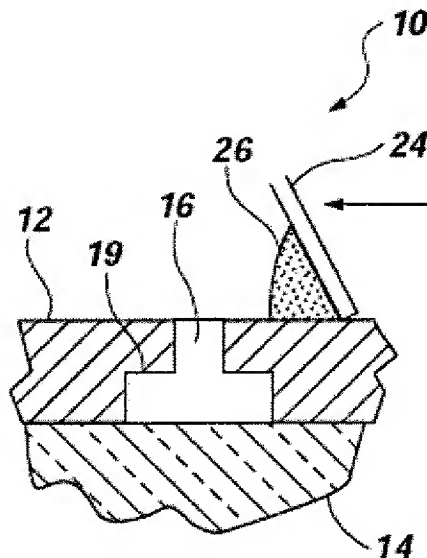


Fig. 2

MAILING ADDRESS OF SENDER (Please do not use customer number below):

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230 South 500 East, Suite 300
Salt Lake City, Utah 84102 USA

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.
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THE PATENT & TRADEMARK OFFICE MAILROOM DATE
STAMPED HEREON IS AN ACKNOWLEDGEMENT THAT ON THIS
DATE PATENT & TRADEMARK OFFICE RECEIVED

Transmittal Letter (2 pages, in duplicate); Part B - Issue Fee Transmittal
(1 page); Request to Apply Previously Paid Issue Fee to Issue Fee Required
by New Notice of Allowance (2 pages); Copy of Decision on Petition
(1 page); Amendment Pursuant to 37 C.F.R. § 1.312(a) (9 pages);
Replacement Sheet of Drawings (1 sheet) and Annotated Sheets Showing
Changes Made (1 sheet); Comments on Statement of Reasons for
Allowance (2 pages); and Fee Addressee for Receipt of PTO Notices
Relating to Maintenance Fees (2 pages)

RECEIVED

JUL 10 2006

Invention: METHOD AND STENCIL FOR EXTRUDING
MATERIAL ON A SUBSTRATE

TRASKBRITT, P.C.

Applicant(s): Cobbley et al.

Filing Date: June 26, 2003

Serial No.: 10/608,750

Date Sent: June 29, 2006 via Express Mail Label No.
EL 995988184 US

Docket No.: 2269-3394.5US

JRD/njj:lmh



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Cobbley et al.

Serial No.: 10/608,750

Filed: June 26, 2003

For: METHOD AND STENCIL FOR
EXTRUDING MATERIAL ON A
SUBSTRATE

Confirmation No.: 7191

Examiner: R. Yan

Group Art Unit: 2854

Attorney Docket No.: 2269-3394.5US
(97-0299.04/US)

Notice of Allowance Mailed:

March 30, 2006

NOTICE OF EXPRESS MAILING

Express Mail Mailing Label Number: EL 995988184 US

Date of Deposit with USPS: June 29, 2006

Person making Deposit: Wendy Neff

AMENDMENT PURSUANT TO 37 C.F.R. § 1.312(a)

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

Please amend the above-referenced application as follows:

Amendments to the specification begin on page 3 of this paper;

Serial No. 10/608,750

A listing of the claims are set forth in the listing of the claims that begins on page 5 of this paper;

Corrections to the drawings are summarized on page 8 of this paper, with a replacement sheet and an annotated sheet showing the corrections enclosed herewith; and

Remarks start at page 9 of this paper.

IN THE SPECIFICATION:

Please amend paragraph [0004] as follows:

[0004] As the size of the features of a semiconductor device continues to decrease with each generation, ever greater precision is required in order to apply viscous material to the surface thereof. This includes the application of solder paste to the surface of a printed circuit board or die for securing a flip chip thereto. Metal stencils are currently utilized to apply the solder paste onto the surface for connecting the contact pads of surface mounted flip chips. These stencils typically have a plurality of ~~apertures that are~~ apertures, each formed in the stencil in predetermined locations that correspond to the pattern of the contact pads on the printed circuit board of choice.

Please amend paragraph [0026] as follows:

[0026] In FIG. 2, once the stencil 12 is placed upon substrate 14 of a semiconductor device, a material 26 is applied across the top surface of stencil 12 via a wiper 24. The material 26 extrudes through the first portion of aperture 16 being constrained by first wall 18 and further extrudes through the second portion of the aperture 16, not contacting the second wall 20 thereof. As illustrated, material 26 contacts surface 22 (FIG. 1) of substrate 14, having an area substantially the same shape as formed by first wall 18. The extruded material 26 only contacts the first wall 18 of the aperture 16 of the stencil in a small area adjacent the top or upper end of the first portion formed by first wall 18 of aperture 16. Illustrated in FIG. 3 is the extruded material remaining on the substrate 14 as material element 28.

Please amend paragraph [0029] as follows:

[0029] The apertures 16 formed by walls 18 and 20 may have any desired overall shape or each portion may have any desired shape, such as square, circular, oval, rectangular, other polygonal shapes or combinations thereof. The aperture 16 and the portions thereof formed by walls 18 and 20 each have a nominal diameter. The height or thickness of the material element 28 is typically greater than the nominal diameter thereof, but can also be substantially

the same height and nominal diameter. The ratio of vertical height to the nominal diameter of the material element 28 at the base thereof ranges from 0.1 to 10. This range translates ~~to from~~ from 0.001" to 0.050" in height and from 0.0011" to 0.5" in diameter. The thickness of the stencil 12 ranges from 0.1 to 10 times the nominal diameter of the aperture 16 adjacent the top surface of the stencil 12 in forming material element 28. This range of height to nominal diameter ratios is achievable only because of the ability to extrude or apply the material as disclosed and illustrated herein, rather than as done in the prior art methods using other stencils. What limits the ratio of the element height versus the diameter at the base of the material element 28 is the viscosity of the material 26, as well as its thixotropic index. Thixotropic, highly viscous materials are used that have a viscosity typically ranging from 30K to 310K centipoise with approximately 70K centipoise being preferred. The thixotropic index typically ranges from 1.7-3.2, with approximately 2.5 being preferred.

IN THE CLAIMS:

None of the claims have been amended herein. All of the pending claims 1 through 11 are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended.

1. (Previously presented) A method for forming paste on a surface of an object comprising:
providing a stencil having a plurality of apertures formed therethrough from a top surface of said stencil to a bottom surface of said stencil, at least one aperture of said plurality of apertures including a first portion having a first cross-sectional area formed by a first wall portion having a first diameter and extending generally vertically from said top surface of said stencil, a second portion of said at least one aperture of said plurality of apertures adjacent said bottom surface of said stencil and having a second cross-sectional area formed by a second wall portion having a second diameter larger than said first diameter of said first wall portion and extending generally vertically from said bottom surface of said stencil, said stencil having a thickness in a range of from 0.1 to 10 times said first diameter of said first wall portion of said at least one aperture of said plurality of apertures, and at least one sloped annular shoulder having a shape located between said first wall portion and said second wall portion of said at least one aperture of said plurality of apertures;
applying said stencil to said surface of said object;
applying paste to said stencil;
wiping said paste across said top surface of said stencil to force said paste through said plurality of apertures;
preventing contact of said paste with a portion of said second wall portion of said at least one aperture of said plurality of apertures during said applying said paste to said stencil by said second cross-sectional area of said second portion of said at least one aperture of said

plurality of apertures being larger than said first cross-sectional area of said first portion of said at least one aperture of said plurality of apertures; and
removing said stencil and leaving portions of said paste in a substantially vertical column.

2. (Previously presented) The method according to claim 1, wherein said applying further comprises:
applying said paste to said top surface.

3. (Original) The method according to claim 1, wherein said paste has a viscosity of approximately 70K centipoise.

4. (Original) The method according to claim 1, wherein said paste has a thixotropic index ranging between about 1.7 to 3.2.

5. (Original) The method according to claim 1, wherein said paste has a thixotropic index of approximately 2.5.

6. (Original) The method according to claim 1, wherein said stencil is made of stainless steel.

7. (Original) The method according to claim 1, wherein said stencil is made of plastic.

8. (Original) The method according to claim 1, wherein said at least one sloped annular shoulder slopes from said first portion of said at least one aperture of said plurality of apertures towards said second portion of said at least one aperture of said plurality of apertures.

9. (Original) The method according to claim 8, wherein said at least one sloped annular shoulder has an acute shape.

10. (Original) The method according to claim 8, wherein said at least one sloped annular shoulder has an obtuse shape.

11. (Original) The method according to claim 8, wherein said at least one sloped annular shoulder has an indented shape.

IN THE DRAWINGS:

The attached sheet of drawings includes corrections to FIGs. 1 and 2. This sheet, which includes FIGs. 1 through 6, replaces the original sheet including FIGs. 1 and 2.

Specifically, FIG. 1 has been revised to switch reference numerals --16-- and --18-- with each other and to redirect the lead line extending from the new reference numeral --16-- to indicate the center of the aperture; FIG. 2 has been revised to lengthen the lead line extending from reference numeral --16--. No new matter has been added.

REMARKS

This amendment corrects errors in the text and drawings. Entry is respectfully solicited.

This amendment is submitted prior to or concurrently with the payment of the issue fee and, therefore, no petition or fee is required. No new matter has been added.

Respectfully submitted,



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Telephone: 801-532-1922

Date: June 29, 2006
JRD/csw

Enclosures: Replacement Sheet
Annotated Sheet Showing Changes

\\Traskbritt1\Shared\DOCS\2269-3394.5US\178323.doc

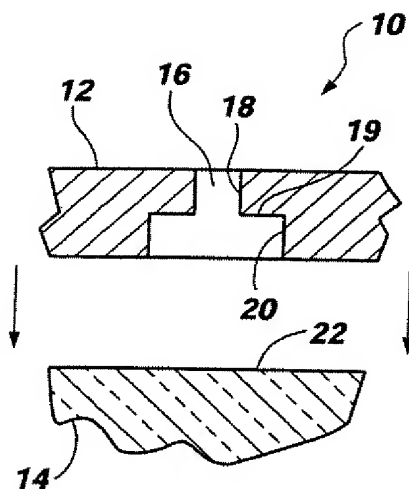


Fig. 1

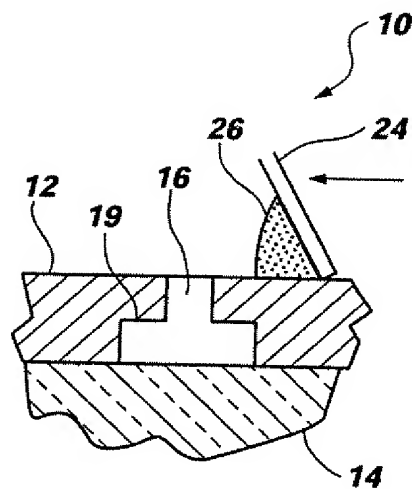


Fig. 2

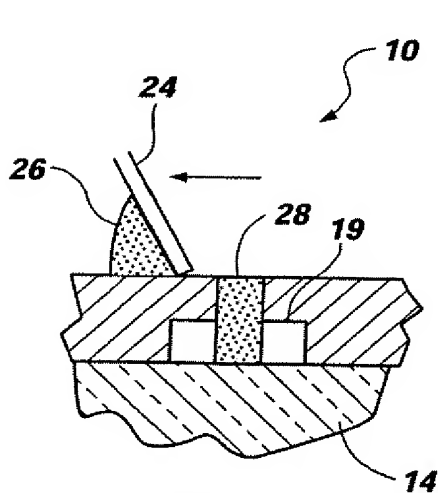


Fig. 3

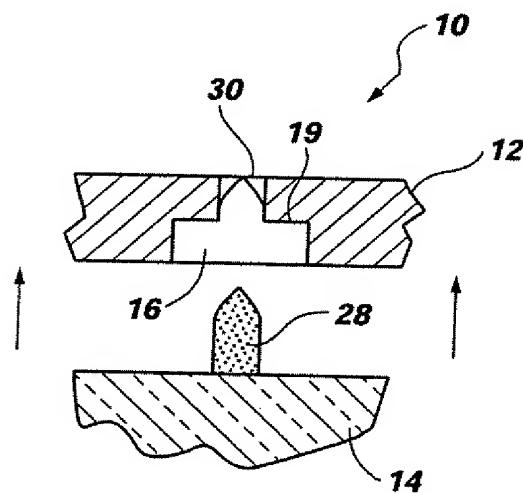


Fig. 4

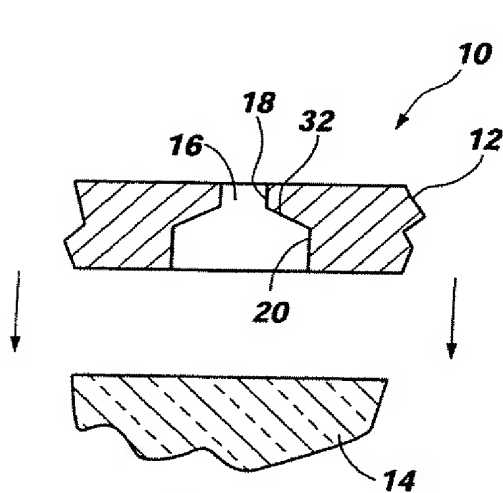


Fig. 5

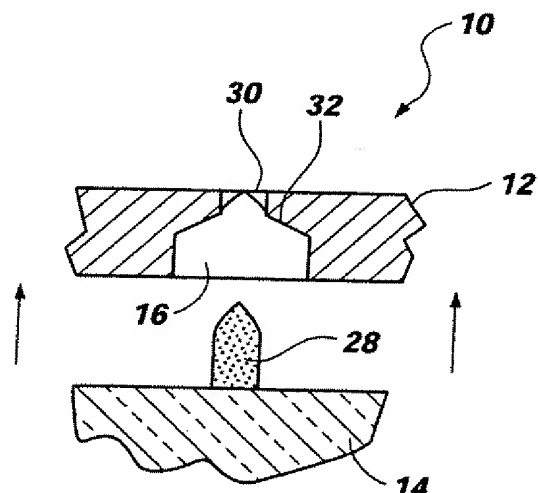


Fig. 6

1/3

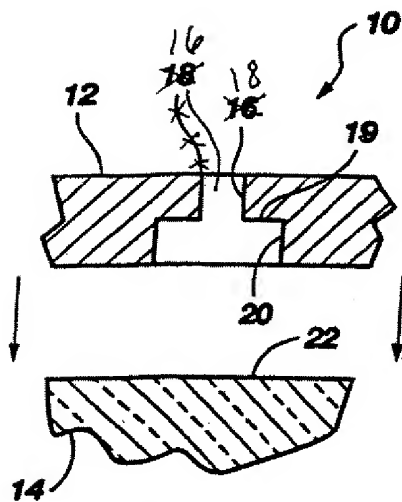


Fig. 1

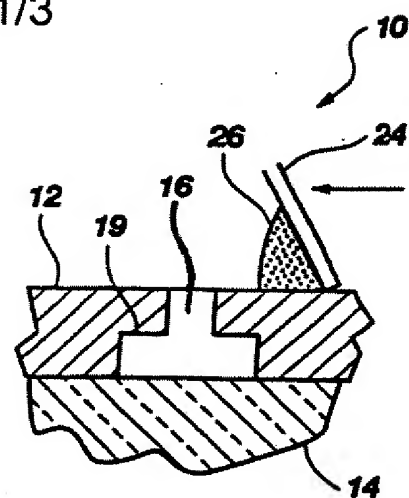


Fig. 2

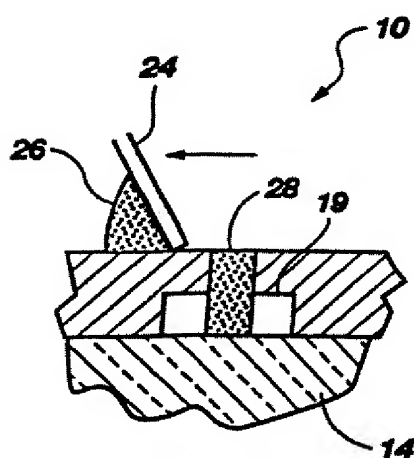


Fig. 3

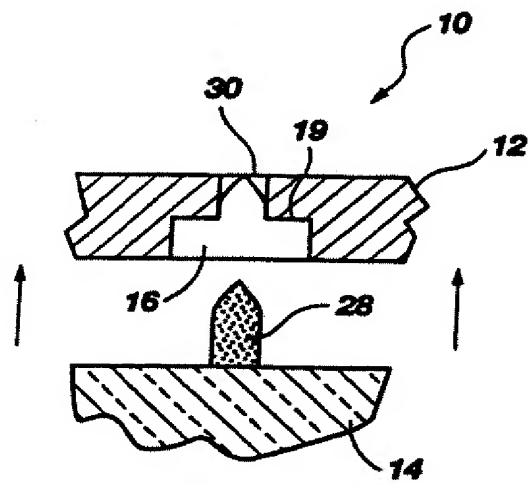


Fig. 4

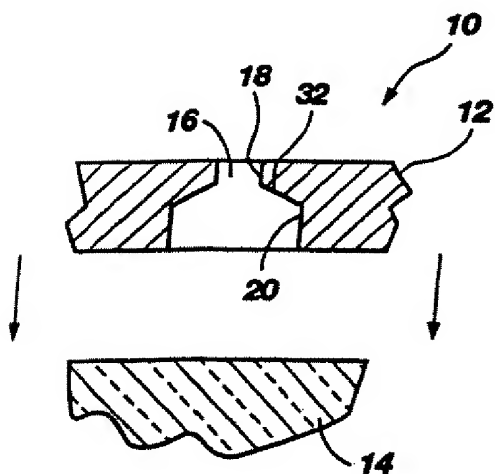


Fig. 5

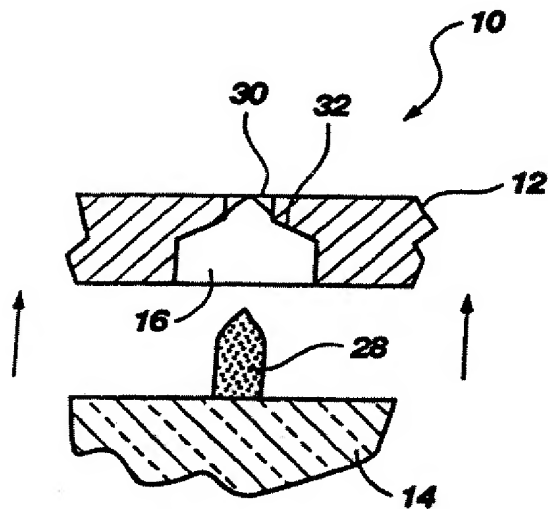


Fig. 6